# On Nuclear Structure Effects in the Nucleon-Induced Fission Cross Sections of Nuclei Near $^{208}$Pb at Intermediate Energies

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The results of the fitting of the energy dependences of the neutron-induced fission cross sections of $^{205}$Tl, $^{204,206,207,208}$Pb and $^{209}$Bi measured in recent works [1,2] are given. There are indicitations that the fission cross section of $^{208}$Pb formed in the reaction $^{207}$Pb+n at excitation energies lower than 50 MeV (when the contribution of the emission fission is small, i.e., the compound nucleus gives the main contribution to fission) is lower than of $^{209}$Pb ($^{208}$Pb+n). At higher energies all the cross sections increase with the increase of the fissility parameter $Z^2/A$. Such a behaviour of the cross section of $^{208}$Pb is predicted by the computer code TALYS [3] as a consequence of the high (maximum for a lead isotope) barrier of the doubly magic nucleus.

The relaxation of shell effects with increasing of excitation energy is traced also by comparison of the dependences of the fission cross section ratios of various nuclei to the $^{209}$Bi fission cross section versus nucleon energy. For comparison, data on neutron-induced fission cross section ratios were taken from the papers [1,2] and data on both neutron- and proton-induced fission cross section ratios - from [4]. The experimental dependences are compared with theoretical ones calculated by TALYS. The degree of the agreement is discussed.

The problem of the role of nuclear deformation (the sphericity of nuclei having closed shells) in the competition of fission and neutron emission - a possibility that the stabilizing influence of a high barrier is compensated by destabilizing effects due to the low collective enrichment of the level density of spherical nuclei - was recently risen in connection with determination of the fission cross sections of Ra isotopes (near N=126) [5]. This issue is investigated by a comparison of the fission cross sections of lead isotopes with the ones of deformed nuclei.

1. G.A.Tutin et al, this conference
2. I.V.Ryzhov et al, this conference
3. A.J. Koning, S. Hilaire, M.C. Duijvestijn, this conference.
4. V.P. Eismont, Final Project Technical Report of ISTC 1309.
5 A Heinz, K.-H. Sabmiold, A. R. Funghous et al, GSI Preprint 2002-25 August.

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